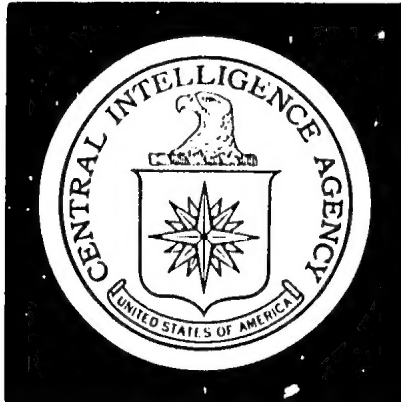


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Intelligence Memorandum

*The World Tin Market:
Some Implications For US Stock Disposals*

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May 1971

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
May 1971

INTELLIGENCE MEMORANDUM

THE WORLD TIN MARKET:
SOME IMPLICATIONS FOR US STOCK DISPOSALS

Introduction

1. The US Government has been considering plans to reduce its tin stockpile by about 20,000 long tons. Although these plans have been temporarily shelved, major world producers are concerned over the impact on their economies should US surplus sales be resumed. Bolivia has been the most outspoken in its opposition, arguing that sales would depress world market prices sharply. This memorandum examines world tin market trends, assesses the outlook for tin prices over the next several years, considering the likely effect of any releases, and estimates the impact on major exporting countries.

Discussion

The World Tin Industry

2. Six countries have about 95% of proved Free World tin reserves and provide a like proportion of exports. Malaysia, by far the leading producer, accounted for 41% of Free World production in 1969 and second-ranking Bolivia 17% (see Figure 1). Four other major producers, Thailand, Indonesia, Nigeria, and Congo (Kinshasa), account for 30% of production. The remaining 12% is produced mainly by countries such as

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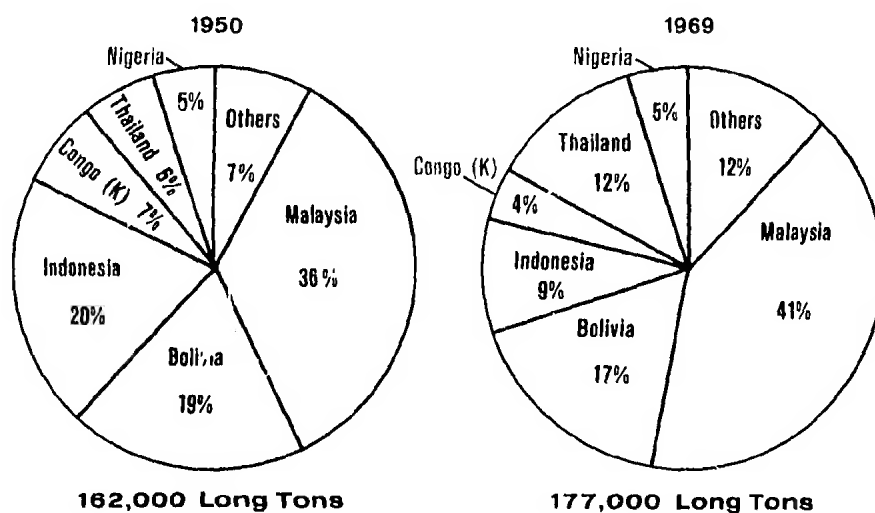
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Australia, Brazil South Africa, and the United Kingdom, which consume most of their output domestically. The Communist countries collectively are largely self-sufficient, although they have become substantial net tin importers in recent years. In 1969 they purchased roughly 10% of Free World tin metal exports.

Free World Production of Tin-in-Concentrates

Figure 1



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3. More than two-thirds of the Free World's known reserves are found along the river beds, delta regions, and adjacent offshore areas in Southeast Asia. These deposits have the highest metal content and are the least costly to exploit. Dredging and placer mining are the region's most common types of operations.^{1/} Both involve few people and require relatively small amounts of capital. In Africa and Bolivia, on the other hand, tin is extracted from underground either by open-cast or shaft mining depending on the depth of lodes. The metal content of these deposits is lower than in Southeast Asia, and substantially more capital and labor are required.

1. Placer mining involves turning deposits into a slurry form which cascades down a trough, separating the tin concentrates from other matter.

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4. Almost all ores are smelted locally. In fact, Malaysia accounts for more than half of Free World smelter production, processing local ores and some of those mined in Indonesia and Australia as well. Bolivia still ships ores mainly to smelters in the United States and to the United Kingdom, but a smelter completed in 1970 will eventually process most local ores.

5. Free World producers have banded together to regulate the tin trade. Actual market control is handled by the London-based International Tin Council (ITC), formed in July 1956.^{2/} It establishes world ceiling and floor prices for tin, and it can use, if necessary, export controls and a tin buffer stock to maintain prices within the band. Although consumers and producers have an equal vote on the council, decisions almost always favor producing countries. On major issues they vote virtually as a bloc and more often than not they can get at least one consuming country to vote their way.

Postwar Trends

6. Free World production and consumption have grown slowly -- on the average about 1% annually -- during the period since World War II, but growth has been uneven. During most of the 1950s production was about stable in spite of large-scale US tin stockpiling. The end of US stockpile accumulation plus temporary heavy Communist sales to the West in the late 1950s created a surplus and forced production cutbacks. Production recovered in the early 1960s, and continued to grow rapidly through 1968, largely in response to booming Japanese demand. In 1969, production declined slightly, mainly due to the joint action of producers desiring to support prices. The market tightened considerably in 1970.

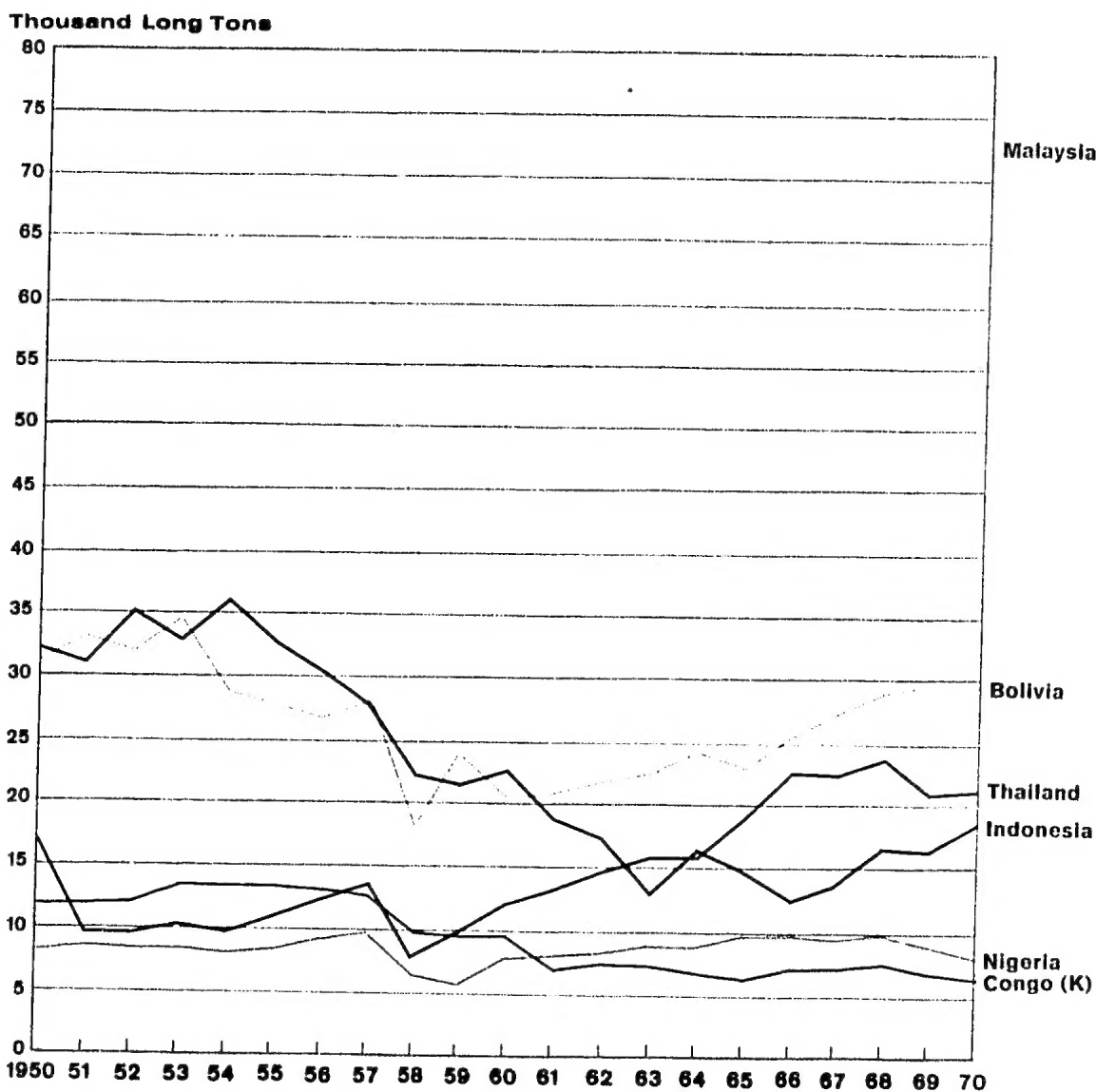
7. Only Malaysia and Thailand, among the six top producers, have increased output since 1950. Between 1950 and 1968 their combined production rose about 45%. Since 1968, however, their output has fallen slightly (see Figure 2). Political and economic chaos held production down

2. *The ITC was formed under the First International Tin Agreement, which went into effect in 1956. Subsequent agreements came into force in 1961 and 1966. The Fourth International Tin Agreement has already been negotiated and will become effective in July 1971. Producing members under the Fourth Agreement will include Malaysia, Bolivia, Indonesia, Thailand, Nigeria, Congo (K), and Australia. All major consuming countries except the United States will be members. The major change in membership from the previous International Agreement will be the addition of the USSR and West Germany as consuming countries and Australia's shift from a consuming to a producing country.*

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CONFIDENTIAL**Production of Tin-in-Concentrates by Major Producers**

Figure 2



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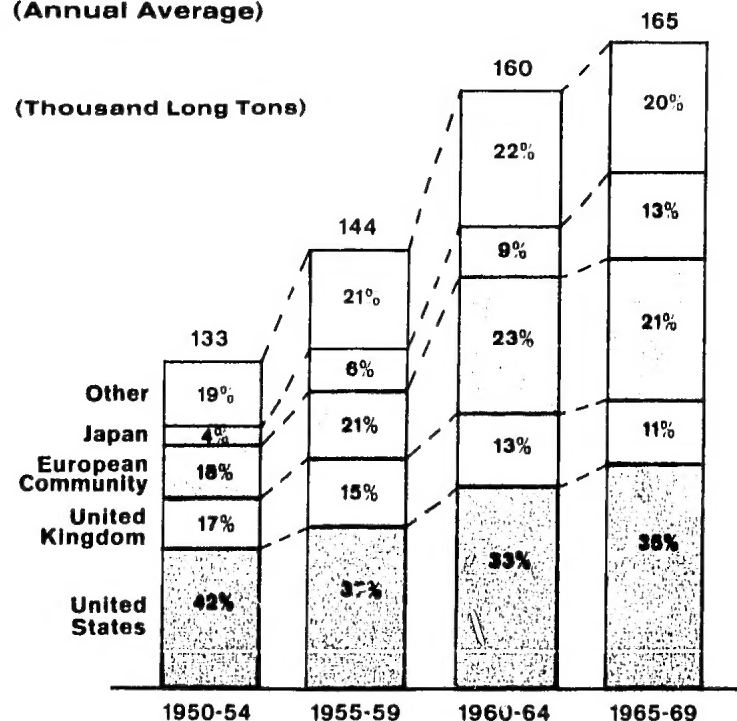
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in Bolivia, Indonesia, and Congo (K), and in spite of some recent improvements their combined output of tin-in-concentrates in 1969 was still one-third below the 1950 level. Nigerian production in recent years also fell, partly because of the civil war there.

8. Among the major consuming countries, only Japan has substantially increased consumption during the past two decades (see Figure 3). Indeed, Japan accounted for virtually all the increase during the 1960s and is now the world's second largest tin market. Consumption in the United States, by far the largest market, declined sharply between 1950 and 1960 and has since risen only slightly. The reverse occurred in Western Europe where consumption rose during the 1950s but declined by about 10% between 1960 and 1969.

**Primary Tin Metal Consumption
in the Free World
(Annual Average)**

Figure 3



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9. The slow growth in tin demand largely reflects both the substitution of other materials and more efficient manufacturing techniques. Tinplate production -- which accounts for more than half of tin used -- increased very slowly during the 1960s because of competition from less expensive aluminum and tin-free-steel (TFS).^{3/} Moreover, the adoption of electrolytic processing has reduced tin requirements for each ton of tinplate by almost 15% since 1960 and 35% since 1950.^{4/} Consumption of tin for solder, which absorbs almost 20% of tin supplies, has also stagnated over the years. The development of electron beam and spot-welding, printed circuitry, and plastic tubing has either eliminated the need for solder or sharply reduced its consumption in many industries.

10. Tin prices have moved upward despite the slow growth of demand. After remaining within a range of about \$0.90-\$1.00 per pound ^{5/} from 1955 to 1960, prices turned up during the first half of the 1960s when production failed to meet demand. Most of the price increase occurred during 1964 and 1965.^{6/} In the latter year the average price reached a record of \$1.76 a pound. During the next few years prices fell steadily to an average of \$1.42 in 1968 as production outpaced demand, but rebounded in 1969 and 1970. Last year the price averaged \$1.67 per pound and has remained near that level in recent months (see Figure 4).

11. Besides politically disruptive events which affected production, the upward price movement reflected operations of the International Tin Council. The ITC steadily raised the floor price for tin during the past decade from 91¢ per pound in 1960 to \$1.47 in late 1970. When prices

3. *By the end of the 1960s, aluminum and tin-free-steel were accounting for about 20% of US can production, compared with practically none in 1960.*

4. *Electrolytic tin-plating requires approximately 5 to 15 pounds of tin per long ton of tinplate. This compares with 25 to 35 pounds of tin required when the older hot-dipped process is used. In 1960, approximately 80% of Free World tinplate production used the electrolytic process, but by 1968 the share had risen to over 90%.*

5. *All price data in this memorandum are average London Metal Exchange cash prices for tin metal.*

6. *Actually, prices began their steep climb during the last quarter of 1963 and partly reflect Indonesia's confrontation policy with Malaysia and the suspension of trade ties beginning in September 1963. Until then all Indonesia's tin concentrates were sent to Malaysia for smelting. Although Indonesia shipped its ore to the Netherlands after relations with Malaysia were broken, the interruption in trade patterns certainly helped set the price rise in motion.*

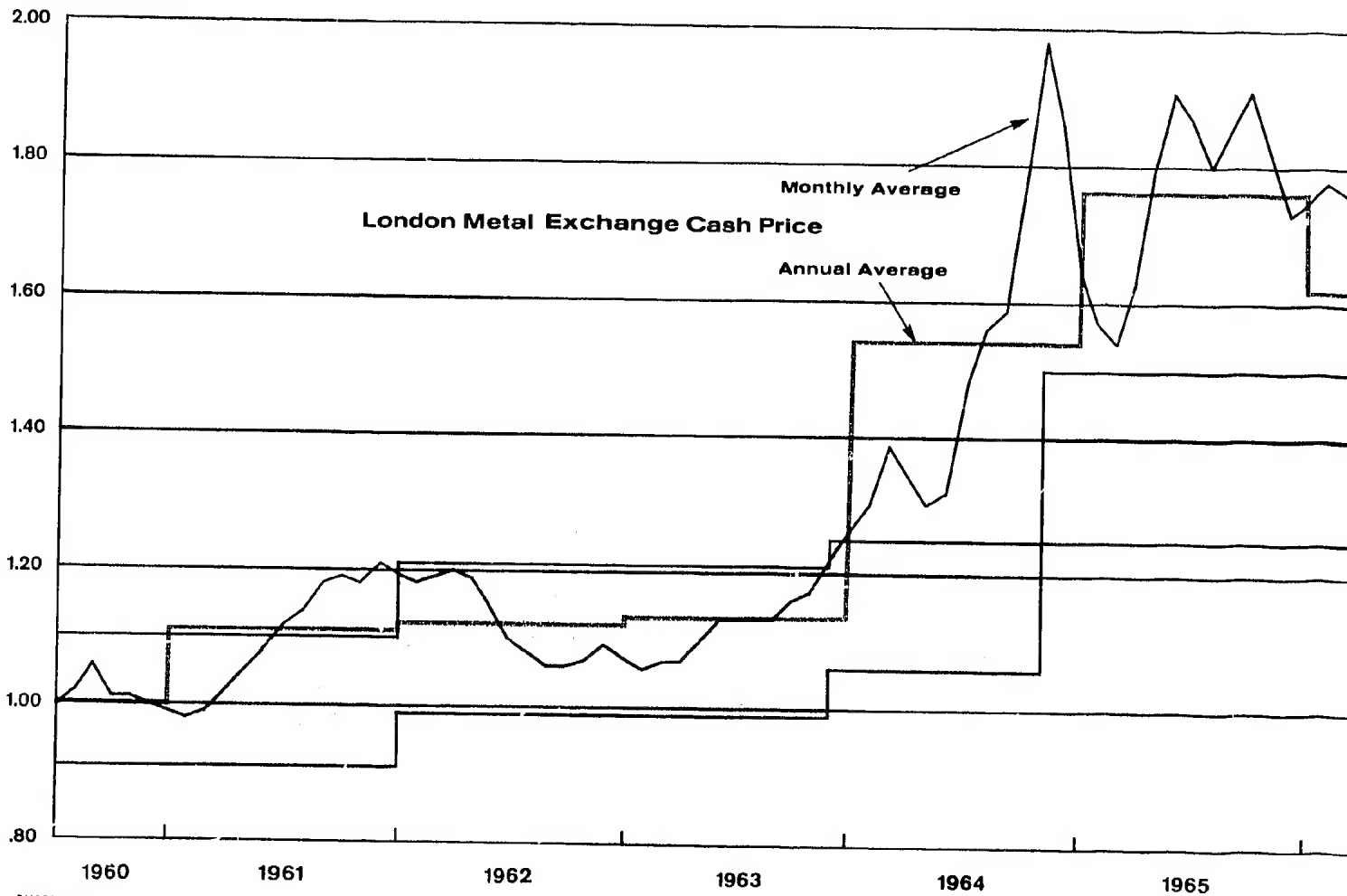
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Tin Metal Prices

Dollars Per Pound

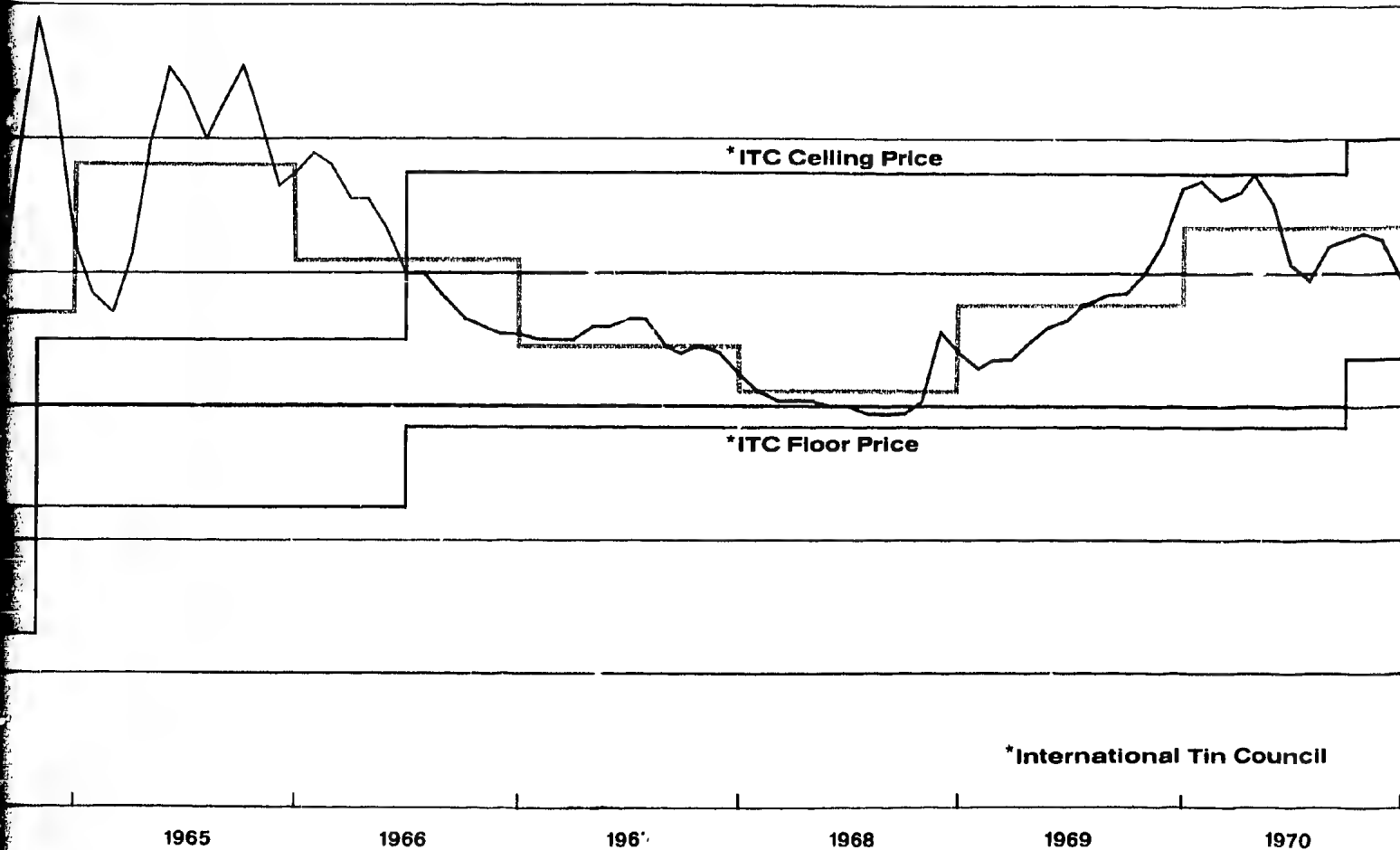


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Figure 4



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neared the floor level, the ITC imposed export controls and made some buffer stock purchases. Export restrictions have been the main tool and in the past 15 years quotas were imposed twice – during 1958-60 and 1968-69. The 1968-69 quotas caused tin metal production to drop about 3% in 1969, while other factors, such as reduced operations at the United States' only smelter, caused an additional 2% fall. This plus an unusually large 4% rise in consumption underlies the 1969-70 price increases.

12. The ITC has had little trouble maintaining the floor price, but prices have frequently exceeded the ceilings set by the ITC. Although the tin buffer stock is used to help minimize price fluctuations and keep them within the ceiling-floor range, stockpile operations have been largely ineffective when working against price increases. The problem is that the buffer stock was never very sizable, rarely exceeding 10,000 tons and more often than not standing at less than 5,000 tons, or about 3% of consumption. Indeed, after the sale of some 4,000 tons in early 1970, the buffer stock was almost completely exhausted.

Impact on Major Tin Producers

13. Bolivia is by far the producing country most dependent on tin exports – tin accounts for about one-half of export earnings and directly almost 10% of gross national product (GNP). Tin is also important in Malaysia and Thailand where it provided 18% and 11%, respectively, of total export earnings in 1969 (see Figure 5). For most other major exporting countries, tin exports are relatively unimportant. Tin accounts for only about 5% of Indonesian export earnings and an even smaller share of Nigerian and Congolese exports. In none of these countries does tin production contribute more than 1% to GNP.

14. Bolivian production dropped sharply after major tin mines were nationalized in 1952. Although rising tin prices during the 1960s stimulated Bolivia's output, the industry has not reached the level of production set in the early 1950s. Investment has been only sufficient to cover maintenance, and except for a few small private operations, no new mines have been opened in more than 20 years. Labor strife and gross mismanagement have hampered operations especially in the nationalized mines. These problems are somewhat less serious for the private mines, which account for about 35% of total production.

15. Bolivia is now the world's highest cost producer. Despite a general improvement in the latter 1960s, production costs in government mines, averaging about \$1.50 a pound 7/ last year, are still out of line with those

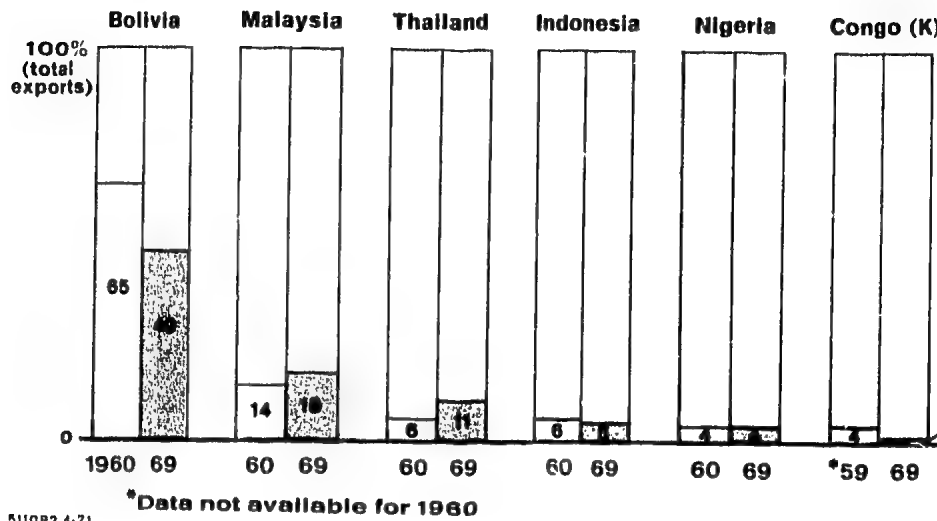
7. *Including export taxes, transportation costs, and smelting costs.*

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Major Tin Exporting Countries
(Tin exports as percent of total exports)

Figure 5



of other producing countries. Wage rates are inordinately high in relation to productivity and the wages of competitors – averaging nearly \$100 monthly or about one-third higher than in Malaysia – and featherbedding is widespread. During 1970 there were an average of two aboveground workers for every underground miner compared with the relationship of less than 1 to 1 that existed before the mines were nationalized. Political factors prevent any significant labor force or wage reductions, and perhaps half a dozen government mines accounting for about one-third of state-owned output operated at a loss last year. Because of high costs the Bolivian government earns little income from the tin industry and therefore has few resources to invest elsewhere. At the same time, political instability discouraged private investment. In consequence, Bolivia has achieved little economic growth or diversification.

16. In Malaysia and Thailand the tin industry prospered during the 1960s. Foreign-owned operations were not interfered with and their output has been maintained at fairly high levels. In both countries the bulk of the increase in production during the 1960s came from the growing number of small-scale producers who were attracted by higher world prices. Between:

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1960 and 1968 the number of these operations in Malaysia, mainly Chinese-owned, about doubled and their output rose more than 120%.

17. Although unit costs have risen over the years as ore grades declined, tin mining in both countries is still highly profitable. Some Malaysian dredging companies, for example, reported after-tax profits equal to approximately 20% of gross sales during 1968-69. The comparable figure for the small placer mines is probably much less because they frequently work lower grade deposits and output per person is only about half that of the dredging sector. Even so, industrywide production costs probably average between \$1.00 and \$1.20 per pound of tin.

18. The good performance of Malaysia's tin industry, while important, has not been crucial to the country's substantial economic progress. Actually the industry employs less than 2% of the labor force and output rose only about 3.5% annually - little more than half the rate of real GNP growth during the 1960s. The main factors underlying the country's expansion were development of new commodities, such as timber and palm oil, and a booming manufacturing sector. The chief contribution of tin was to enable the country to maintain a high level of export earnings. Receipts from tin exports more than doubled during the 1960s, with higher prices accounting for 70% of the increase, and consequently Malaysia was able to rapidly build up its foreign exchange holdings. These amounted to about \$940 million at the end of 1970 - equal to eight months of imports.

19. Thailand also achieved a very satisfactory economic growth rate during the 1960s. Production of many commodities grew rapidly and the country benefited from US Vietnam-related military spending. Thailand's export earnings increased considerably between 1960 and 1969 - about 6% annually. Although tin exports tripled in value during this period they accounted for only about one-sixth of the total rise in exports and tin still contributes little more than 1% of GNP.

The US Tin Stockpile

20. In 1970, with world tin prices at a relatively high level, the United States made known it was considering resuming tin disposals from the strategic stockpile. The stockpile, built up rapidly during and after the Korean War, reached more than 350,000 tons or nearly a seven year supply for the United States by the end of the 1950s. Some disposals were made through the US aid program during 1960-61 and in 1962 large-scale commercial sales were begun partly because of reduced requirements but also to help offset the gap between world production and demand. Deliveries totaled about 100,000 tons between 1962 and mid-1968, when commercial sales were suspended because of the fall in world market prices. Although

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some aid disposals have been made since then, the stockpile has not been reduced significantly and currently stands at about 252,000 tons and is worth about \$900 million at today's prices.

21. Initially, plans called for reducing the stockpile by about 20,000 tons to 232,000 tons. The sales were to be made over roughly a four-year period beginning around mid-1971. The prospect of new commercial sales, however, stirred an immediate reaction from Bolivia which felt that the sales would depress prices and in turn seriously hurt its already weak tin industry. Indeed, La Paz threatened to nationalize remaining US mining operations in the country in retaliation for any commercial stock sales. Other major producers also opposed commercial stock releases. Stock disposal plans were put in abeyance in early April 1971.

22. Although no commercial sales from the US stockpile have been made, the news that such sales were being considered affected prices. On the London Metal Exchange price quotations fell by about 5% during June 1970 in the wake of rumors that US sales were in the offing. Prices recovered somewhat in the next few months but declined again in November when it was announced that a Congressional inquiry into tin stock disposal plans would be held. A similar reaction occurred in early April 1971 when Bolivia's President Torres leaked a press story of imminent US stock disposals. These movements reflect the highly speculative nature of world tin exchanges.

Outlook

23. A sharp drop in tin prices during the next several years seems unlikely whether or not US stock disposals are resumed. Last year, tin metal production fell short of consumption by about 6,000 tons, or 3%, and the difference was made up by drawdowns from commercial stocks which now stand at or near a 15-year low. With world production and consumption (including net sales to Communist countries) expected to grow about 1% annually through 1975, US stock sales would nearly offset the shortfall in the supply.

24. Tin consumption in the United States will either stagnate or decline during the coming years because of increasing competition from other materials. Aluminum and tin-free-steel are expected to reduce demand for tinplate, and in fact several US tinplate producers shut down operations in the past year or so. Other major tin consumers, such as Japan and West Germany, will also be making greater use of tin substitutes during the coming years, but their overall demand for tin is expected to increase as their canning industries expand. Consumption in Communist countries is likely to grow somewhat faster than their production, and net imports from

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the West thus will increase. Under these circumstances, overall demand for Free World tin will probably increase to nearly 200,000 tons by 1975, compared with about 187,000 tons in 1969.

25. Production could increase considerably faster than demand, but this seems unlikely. Malaysia and Thailand are in an especially good position to raise their output. Recent technological innovations in dredging will allow mining of deep offshore deposits which contain high-grade ores, and newly developed excavating techniques can prolong the life of placer mines. Both countries, however, watch the world tin market closely and are unlikely to grant new mining licenses if it means upsetting the balance. Beyond this, other major producers will have trouble raising their output. Indonesia's rehabilitation program is moving ahead only slowly, and no increase in output is expected from either Nigeria or Congo (K). Bolivia will be hard pressed to maintain even present output levels through the mid-1970s. Known reserves at the large Catavi mine are almost exhausted, and renewed labor strife and government takeovers of some private mining operations are distinct possibilities.

26. The producing countries themselves are in an excellent position to prevent any sustained drop in prices. The buffer stock is now very low and the ITC could purchase up to 20,000 tons of tin -- roughly equivalent to planned US sales if stockpile disposals are resumed. Use of the buffer stock has recently been made easier because the International Monetary Fund (IMF) has agreed to help finance country contributions.^{8/} If necessary, export controls can be adopted.

27. The producers protected themselves from a sharp price decline when they raised the ITC floor price about 7% to \$1.47 a pound in October 1970. The action was probably made with an eye toward bolstering the tin market in the wake of possible US stock releases and perhaps forestalling any commercial sales. According to a 1966 understanding with the ITC the United States stated it would do nothing inconsistent with the "contingency operations" of the ITC. Although this statement has no precise meaning, under earlier disposal programs it meant that if the ITC was purchasing in the market, the United States would not sell stocks. By raising the floor price, producing countries have insured that the ITC would enter the market at an earlier point than before.

28. For producers the range of foreign exchange earnings from tin is relatively narrow. With prices at the present ITC floor and with stagnating

8. IMF assistance would be available for countries experiencing balance-of-payments problems and thus would be of special significance for Bolivia.

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tin consumption, earnings at their lowest would be at roughly the 1968 level through 1975. The best likely situation would be a 1% annual increase in world demand and prices at near the 1970 level of around \$1.67 a pound. In that case, earnings in the next few years would increase very slowly. Malaysia and Thailand will probably obtain almost all the benefits from the expected small increase in world tin demand as the only major producers likely to increase output.

Conclusions

29. Free World tin consumption grew slowly during the 1960s -- by only about 1% annually -- but prices rose sharply as production fell short of demand during most of the decade. The major cause of this development was booming demand in Japan and production problems in Bolivia, Indonesia, and Congo (K) where the tin industry was hard hit by years of political and economic instability. The upward price movement was also supported by operations of the International Tin Council, which steadily raised the floor price for tin throughout the decade and which in the late 1960s imposed export quotas to bolster sagging prices.

30. All producing countries benefited from rising prices, which in 1969 averaged 55% above the 1960 level. Malaysia and Thailand were the chief gainers because of low production costs and expansion of capacity in their tin industries. In neither country, however, was tin a very important factor in their substantial economic progress. In the case of Bolivia, the country most dependent on tin, high production costs keep earnings from tin low and the economy has barely made up losses resulting from the political and economic chaos of the 1950s.

31. The relatively high tin prices of recent years are likely to be maintained over the next several years whether or not the United States resumes commercial stock disposals. Releases from US stocks at levels being considered in early 1971 would add only marginally to supplies from new production, which will probably be slightly below tin consumption. If supply were to outpace the expected slow growth in demand, producing countries would likely restrict exports. Moreover, the ITC has raised its floor price to a record \$1.47 a pound and is in a good position to maintain this price. With its buffer stock largely exhausted the ITC can, if necessary, buy tin for at least three years at rates equivalent to the proposed US stockpile releases.

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